Inventory of upland-nesting birds in Katmai and Lake Clark National Parks and Preserves

Dan Ruthrauff[1], Lee Tibbitts, Bob Gill, and Colleen Handel
Alaska Science Center, U.S. Geological Survey
1011 E. Tudor Road
Anchorage, AK 99503
[1]Contact information: druthrauff@usgs.gov, (907) 786-3432

Inventory Background

- This inventory was conducted within the framework of the National Park Service's (NPS) Inventory and Monitoring (I&M) program, and served as the first systematic survey of birds in upland regions of both parks.
- Prior to this inventory, little was known about the status and distribution of birds in Katmai and Lake Clark National Parks and Preserves (Figure 1), especially at sites away from the coasts, rivers, and major lakes.
- We conducted an inventory of upland sites during the spring seasons of 2004–2006.

Objectives

In order to provide park managers with accurate information on the status, distribution, and habitat affinities of upland-nesting birds, we:

- Collected and summarized all existing information on the occurrence, distribution, and abundance of bird species (particularly upland-nesting species) in Katmai and Lake Clark.
- Implemented a repeatable, scientifically valid sampling design suited to survey birds in expansive areas with limited access.
- Collected vegetation and physical attribute data at each sample point in order to describe avian habitat associations.

Methods

- Sampling frame was all unglaciated, non-lacustrine lands >100m a.s.l. and <50° slope.
- Sample points were allocated to ecological subsections.
- We conducted unlimited distance point counts to survey birds (Figure 2).
- We utilized the Viereck vegetation classification system to classify habitat within 50 m (closed habitats) or 150 m (open) of each survey point.
- To describe distribution patterns of species with respect to habitat and elevation, we defined sites as either low (100–350 m), middle (351–600 m), or high elevation (>600 m). We then assigned the 34 most-commonly detected species to these elevation classes based on their occurrence at sample points, and calculated the percent cover of vegetation types within each category.

Inventory Results

- Inventory period was late May–early June, 2004–2006.
- We conducted 468 point count surveys at 30 10-km x 10-km plots in Katmai and 417 point count surveys at 25 plots in Lake Clark (Figure 1).
- We detected 116 individual species between the two parks (92 in Katmai and 104 in Lake Clark). See handout for complete list of species.

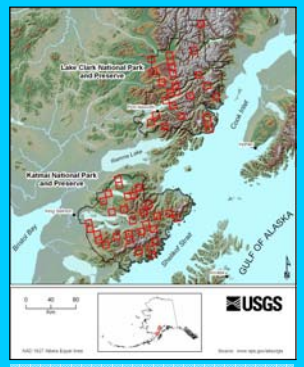

Figure 1. Katmai and Lake Clark National Parks and Preserves, location of the inventory of upland-nesting birds, 2004–2006. We sampled at 30 and 25 10-km x 10-km plots (depicted in red) in Katmai and Lake Clark, respectively.

Figure 11. A Surfbird weathers a summer hail storm while incubating its nest near Turquoise Lake, Lake Clark.

Figure 2. Caroline Van Hemert conducts a point count survey in the Barrier Range near Kinak Bay, Katmai National Park and Preserve, 30 May, 2006.

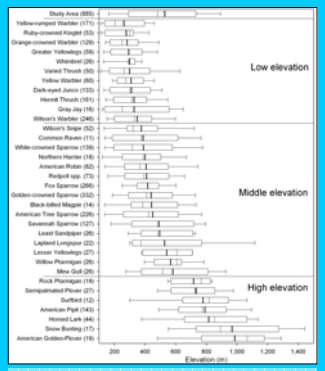

Figure 3. Elevational distribution of common species detected during the inventory of upland-nesting birds in Katmai and Lake Clark National Parks and Preserves, 2004–2006. Box plots show median (thin vertical line), mean (thick vertical line), quartiles (open box), and 10th and 90th percentiles of values (whiskers). Number of detections is shown in parentheses for each species. Species ordered from top to bottom based on increasing values of mean elevation at survey points where they were detected.

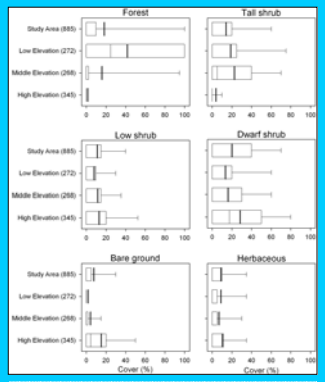

Figure 7. Percent cover of habitats by elevational category at survey points during the inventory of upland-nesting birds in Katmai and Lake Clark National Parks and Preserves, 2004–2006. Box plots show median (thin vertical line), mean (thick vertical line), quartiles (open box), and 10th and 90th percentiles of values (whiskers). Number of points surveyed in each category in parentheses.

Figure 5. American Tree Sparrow at nest. This species was common in low and dwarf shrub habitats at middle elevation sites. Photo courtesy USFWS.

Figure 8. Black (*Picea mariana*) and White (*P. glauca*) spruce at a typical low elevation site, Lake Clark National Park and Preserve, 16 May 2004. Lake Clark in background.

Figure 10. Rock and bare ground at a high elevation site in the Walatka Mountains, Katmai National Park and Preserve, 19 May 2005.

Figure 4. Wilson's Warbler, a species common in tall shrub habitats at low elevation sites. Photo by Donna Dewhurst, USFWS.

Figure 6. A male American Golden-Plover, a species common in dwarf shrub and bare ground habitats at high elevation sites in both parks. Photo courtesy Oscar Johnson.

Figure 9. *Alnus*-dominated tall shrub habitat at a middle elevation site near Lake Clark Pass, Lake Clark National Park and Preserve, 28 May 2004.

Inventory Results, continued.

- The most abundant and widely distributed species were Golden-crowned Sparrow (*Zonotrichia atricapilla*), Fox Sparrow (*Passerella iliaca*), Redpoll *(Carduelis* species*),* and American Pipit (*Anthus rubescens*).
- We detected three species not previously recorded in Katmai (Ring-necked Duck [*Aythya collaris*], Lesser Scaup [*Aythya affinis*], and White-tailed Ptarmigan [*Lagopus leucurus*]), and two species not previously recorded in Lake Clark (Northern Flicker [*Colaptes auratus*] and Olive-sided Flycatcher [*Contopus cooperi*]).
- The elevational distribution of birds is depicted in Figure 3:

→11 species were characteristic of low elevation sites (e.g., Hermit Thrush [*Catharus guttatus*], Yellow-rumped Warbler [*Dendroica coronata*], and Wilson's Warbler [*Wilsonia pusilla*; Figure 4]).

→16 species associated with middle elevation sites (e.g., American Tree Sparrow [*Spizella arborea*, Figure 5], Fox Sparrow, and Lesser Yellowlegs [*Tringa flavipes*]).

→7 species preferred high elevation sites (e.g., American Golden-Plover [*Pluvialis dominica*; Figure 6], American Pipit, and Horned Lark [*Eremophila alpestris*]).

- The percent cover of vegetation types within each elevation category is represented in Figure 7:

→Low elevation sites were dominated by spruce forests (*Picea* species) and tall shrubs *(Alnus* and *Salix* species; Figure 8).

→Middle elevation sites were characterized by shrubs (*Alnus*, *Salix*, and *Betula* species; Figure 9).

→High elevation sites contained dwarf shrubs (primarily *Empetrum* and *Dryas* species) and bare ground (Figure 10).

Inventory Highlights

- First systematic inventory of upland regions of Katmai and Lake Clark, providing a framework for future monitoring efforts.
- Documented the presence of 40 species of conservation concern.
- Documented southern extension of breeding ranges into Katmai for Wandering Tattler (*Tringa incana*), Surfbird (*Aphriza virgata*, Figure 11), and Baird's Sandpiper (*Calidris bairdii*).
- Confirmed breeding for numerous upland-breeding species previously recorded only at low-elevation or coastal sites during migration (e.g., Black-bellied Plover [*Pluvialis squatarola*], American and Pacific [*P. fulva*] golden-plovers in Katmai).
- Identified regionally unique avifaunas in the area surrounding Kukaklek Lake in Katmai and the highlands of Twin/Turquoise/Telaquana lakes in Lake Clark.

Acknowledgements: We thank Patrick Farrell, Nathan Senner, Caroline Van Hemert, David Ward of ASC, Maksim Dementyev of Moscow State University, and Alan Bennett of NPS for assistance in the field. NPS staffs in Port Alsworth and King Salmon provided logistical support. Alan Bennett, Bill Thompson, and Dorothy Mortenson of the NPS I&M program provided financial and technical support.